



Book reviews

Compiled by Brendan Fitzsimons (Edited by Roger Weatherhead and Peter Morgan)

Fitz's Atlas of Coating Defects.

MPI Group, Basingstoke (2000). 200 pages, £125

ISBN 0 9513940 2 9

(CD ROM of the coating defects £150)

www.mpigroup.co.uk

Troubleshooting and consultancy assignments traditionally call for considerable experience over many years, especially in the field of corrosion and protection of metals. Shortening of training programmes and expectations of rapid progress amongst career professional in presenting a major challenge these days and many of us are told that we will have several careers in a single professional lifetime. In order to help detection, diagnosis and treatment of faults, reference handbooks are extremely important. This is particularly true against the unfortunate trend of relatively inexperienced personnel being used to inspect some industrial structures.

Fitz's Atlas of Coating Defects is a vinyl-backed, pocket-sized ring binder containing over 190 illustrations (many of them in colour) and aims to provide a comprehensive guide to coating and surface defects. It is important to realise that the focus of the book is on organic paint coatings applied to on metallic substrates, largely for corrosion protection and anti-fouling reasons.

Two sections consider surface preparation (mostly of metals) and provide notes on standard industrial preparation grades achieved by dry abrasive blasting and water jetting. Over 100 photographs in the Coatings and Application defects section describe a wide range of coating failures. Advice is given on probable causes, prevention and repair. A further section deals with marine fouling then an appendix gives 'breakdown scales' to help determine the degree of coating failure.

Frank Walsh

University of Portsmouth

U.K.

N. Sato

Electrochemistry at Metal and Semiconductor Electrodes.

Elsevier, Amsterdam (1998). 400 pages, US \$ 218.5

ISBN 0444 828060

The author states that the book "is concerned with the structure of the electric double layer and charge transfer reactions across the electrode/electrolyte interface", its purpose being "to integrate modern electrochemistry with semiconductor physics; this approach provides a

quantitative basis for understanding electrochemistry at metal and semiconductor electrodes." It is "aimed towards graduates and senior undergraduates studying materials and interfacial chemistry or those beginning research work in the field of electrochemistry" and is organised in 11 chapters: energy levels of particles (13 pages), energy level of electrons (45 pages), energy level of ions (45 pages), electrode potential (31 pages), electric double layer at electrode interfaces (81 pages), electrochemical cells (11 pages), electrode reactions (21 pages), electrode reactions in electron transfer (54 pages), electrode reactions in ion transfer (34 pages), semiconductor photoelectrodes (47 pages), mixed electrodes (17 pages). Unfortunately, the upper part of Fig. 5-37 is illegibly printed in the review copy of the book and some of the other diagrams are not reproduced at a quality that reflects the book's price, which will tend to deter personal purchasers.

The book's few predecessors include: *Electrochemistry of metals and semiconductors; the application of solid state science to electrochemical phenomena*, A.K. Vijh, Dekker, NY 1973; *Electrochemistry at semiconductor and oxidized metal electrodes*, S.R. Morrison, Plenum, NY, 1980; Yu. V. Pleskov and Yu. Ya. Gurevich, *Semiconductor Photoelectrochemistry*, Consultants Bureau, New York, USA, 1986 (following two other books by Pleskov). Hence, Professor Sato's textbook is a timely addition to that list. It is complementary with the research monograph: *Semiconductor electrodes*, H.O. Finklea (Ed.), Elsevier, NY, 1988, with separately authored chapters on the electrochemistry of individual or groups of semiconductors. Potential purchasers should be aware that the book's solid state physics approach to the subject, though very quantitative, tends to involve relatively little chemical content or examples, and limited discussion of applications, even of corrosion, the author's main interest. The balance between equations and reactions heavily favours the former, as required with such an approach; much use is made of the symbols for those ubiquitous additions to the period table, metal M and solution species X.

Despite the chapter on double layers and a brief explanation of Mott-Schottky plots, there is no mention of experimental techniques such as impedance spectroscopy and little reference to equivalent circuits, but figures giving experimental data for the potential dependence of capacitance for various semiconductors are included, though mainly of 1960s vintage. In addition to the formal physical treatment in Chapter 8, curiously entitled "Electrode Reactions in Electron Transfer", more extensive examples from recent literature of film-covered electrodes would have been appropriate, especially in view of the practical importance of oxidation reactions at oxide-covered anodes. Whereas such an extensive work of scholarship as this will have

had a long gestation period, more of the references at the end of each chapter should have been updated to be at least post 1990.

Despite these reservations about the balance of the text, it is the most extensive and authoritative treatment

of the subject yet in a single text and can be highly recommended for use at graduate level and above.

G.H. Kelsall

University of British Columbia, Vancouver, Canada